



MEMS for Biomechanics and Biorobotics...

December 4, 2017 to December 8, 2017, at VNIT Nagpur

.....

Overview

Biologically inspired robots have greater mobility and flexibility often possess sensing element. With the coupling of neural engineering and artificial sensing skin, biorobotics can be deployed for many useful applications. The course will cover the recent development and current challenges in micromechanical systems (MEMS)/Nanomechanical systems (NEMS) for Biomechanics and Biorobotics application.

The course will begin with the overview of the field and covers the various aspects including fabrication, modeling, circuit design and integration. Fundamentals in biosensing, biomechanics and review of micro/nano fabrication methods will be covered in detail. Physical mechanisms and modeling aspects of bio fluids and tissues will be described. Electronics for robotics including system on chip(SOC) design for sensing application will be discussed along with communication issues. Finally piezo material based actuation and electrostatic actuation will be reviewed for biorobotics.

This short course is primarily targeted towards graduate students and researchers who have not much prior knowledge in MEMS and Biomechanics and its applications in biorobotics, but are interested in expanding their research topics to this field. The participant would be exposed to broader area of MEMS technology including fabrication technology biomechanics and biorobotics including review of theories, design, micro/nano fabrication and characterization with practical case studies and assignments.

Modules	<ul style="list-style-type: none"> • Overview of the state of the art MEMS technology • Keys of MEMS design and process technology learned from historical and representative works • Wafer-level packaging technology • Transducers for microsystems (piezoresistive, capacitive and piezoelectric transduction) • Integration of MEMS and VLSI, Biomems • Application of MEMS in BioMechanics and Biorobotics
You Should Attend If...	<ul style="list-style-type: none"> ▪ Student (B.Tech./M.Sc./M.Tech./Ph.D.) and aspiring researcher within broad domain of MEMS Bio-Robotics. ▪ Industry professionals ▪ PhD students and Post-doctoral scholars. ▪ Faculty from academic institutions and technical institutions.
Fees	<p>The participation fees per person for attending the course is as follows:</p> <p>Participants from abroad: US \$400</p> <p>Industry/ Research Organizations: Rs. 10,000/-</p> <p>Academic Institutions:</p> <p style="padding-left: 20px;">Students: Rs. 3200/- (For SC/ST students course fee is Rs.1600/-only)</p> <p style="padding-left: 20px;">Non-Students: Rs. 6400/-</p> <p>The above fees include all instructional materials, computer use for tutorials, free internet facility, tea and snacks. The course fee is inclusive of 18% GST as per institute norm. The participants may avail single bedded shared accommodation and food (breakfast, lunch and dinner) if requested on additional payment basis.</p>

The Faculty



Prof. Shuji Tanaka is an eminent scientist who has the Tanaka Shuji Labrotary to his credit. He received the B.E., M.E., and Dr. Ing. degrees in mechanical engineering from the University of Tokyo, Tokyo, Japan, in 1994, 1996, and 1999, respectively. He was with the Department of Mechatronics and Precision Engineering, Tohoku

University, Sendai, Japan, as an Assistant Professor from 2001 to 2003, an Associate Professor with the Department of Nanomechanics from 2003 to 2013, and has been a Professor with the Department of Bioengineering and Robotics since 2013. He was a Fellow of the Center for Research and Development Strategy with the Japan Science and Technology Agency from 2004 to 2006, and is currently a Selected Fellow. He was a recipient of the Young Scientists' Prize; the Commendation for Science and Technology Award from the Minister of Education, Culture, Sports, Science, and Technology (2009); the German Innovation Award; the Gottfried Wagener Prize (2012); and seven other prizes. His research interests include Heterointegration, microelectromechanical systems (MEMS) packaging, acoustic devices, RF MEMS, and Power MEMS. He has authored 17 book chapters, 485 original paper contributions, 58 review paper contributions to his credit.



Prof. Rajendra Patrikar is working presently as Professor at Center for VLSI and Nanoelectronics, VNIT Nagpur. He has done his M.Tech and Ph. D in Electrical Engineering from IIT Bombay. He joined as faculty at IIT Bombay after working for an year at Computervision R&D Pune. He worked at in TECH

Semiconductor, Singapore in Advance Device Technology Department (1998-2000). After working there for three years he moved to Institute of High Performance Computing , Singapore which is a supercomputing center (2001-2003). He was a Team Leader of Nanotechnology group at Computational Research Laboratory Pune for one Year. He is a coordinator of Nantional MEMS design centre and also a project on Design of equipment for Microfluidics applications.



Prof. Raghvendra Deshmukh is working presently as Professor at Center for VLSI and Nanoelectronics, VNIT Nagpur He has done his M.Tech from IIT Bombay and Ph. D at VNIT Nagpur. After working for one year in industry he joined as a faculty in the Department of Electronics at VNIT Nagpur. His interest ranges from MEMS Digital system design, Cryptography,

CMOS design. He has done projects in the area of Sensors and Transducers. He also teaches course on Entrepreneurship.

Visvesvaraya National
Institute of Technology,
Nagpur -440010

Maharashtra, India

Course Coordinator

Dr. Rajendra M Patrikar

Phone: +91-7122801336

E-mail: rmpatrikar@ece.vnit.ac.in

Co-Coordinator

Dr. R. B. Deshmukh

Phone: +91-7122801293

E-mail: rbdeshmukh@ece.vnit.ac.in

.....
For Registration:

<http://www.gian.iitkgp.ac.in/GREGN>

For more details:

<http://www.vnit.ac.in>